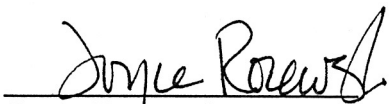
Space Shuttle Program

Process Control Focus Group
2001 Annual Report

Prepared by
The Process Control Focus Group

Approved by:



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Executive Summary

The Process Control Focus Group (PCFG) was formed by the National Aeronautics and Space Administration (NASA) Space Shuttle Program Manager to coordinate process control activities across the Space Shuttle Program (SSP). It provides a forum for the prime contractors to exchange information, combine resources, and leverage process control tools and methodologies to enhance SSP quality and safety.

The PCFG is a NASA-led team with representatives from each of the SSP prime contractors. The following have participants on the team: Johnson Space Center (JSC), Kennedy Space Center (KSC), Marshall Space Flight Center (MSFC), Stennis Space Center (SSC), United Space Alliance (USA), Boeing Rocketdyne, ATK Thiokol Propulsion, Lockheed Martin Space Systems Company, Michoud Operations, Hamilton Sundstrand Space Systems International, and Pratt & Whitney. Boeing Human Space Flight & Exploration also participates on the PCFG as a major subcontractor to United Space Alliance.

The SSP Process Control Management Plan was developed and base-lined as NSTS 37358. This management plan defines methods for implementing and supplementing existing NSTS 07700 process control requirements as they relate to flight hardware and critical ground support equipment.

An extensive multi-media awareness campaign is paramount to reaching the supply base and reinforcing the importance of process control and sharing lessons learned. Videos, posters, websites, and other marketing material have been developed as a mechanism to reach the worker on the floor and affect the culture by encouraging individuals to question when something doesn't look right or consider the potential impacts when there is a process change.

In addition to the awareness campaign, the PCFG is dedicated to sharing best practices and lessons learned. Through the efforts of this team there is a free exchange of information among the prime contractors, and several have implemented processes and/or programs that were shared during these discussions. The sharing of lessons learned is essential to ensuring the success of each mission, while continuing to reduce costs without compromising safety.

The accomplishments of this team has been recognized not only within the SSP, but has extended to the NASA agency. The efforts of the PCFG to increase awareness of process control are commended and is acknowledged as a universal message worthy of reaching across all NASA programs. In recent years, process escapes have occurred across numerous aerospace programs, solidifying that no program is immune to the potential catastrophic and costly events resulting from inadequate process controls.

The PCFG is collaborating with the agency-wide Process Control Working Group (PCWG), which was formed to address process control across the aerospace industry. It is anticipated that through synergism and combined resources there will be a broader penetration into the supply base, resulting in safe and reliable hardware and software for all NASA programs.

The focus of the PCFG this year will be directed towards developing a metric set that indicates the effectiveness of the activities of this team. The PCFG is striving to change the culture throughout the entire SSP including the prime contractors, suppliers, and second and third tier suppliers. To affect or influence a culture change is an enormous task, but through the continued dedication and diligence of the PCFG, prime contractors, and suppliers it is an attainable and desirable goal worth striving for.

Introduction

The NASA SSP Manager established the Process Control Focus Group (PCFG) to concentrate on the topic of Space Shuttle Process Change Control. The purpose of this team was to coordinate process control activities across the entire Space Shuttle Program (SSP).

The PCFG was specifically chartered to:

a. Develop a proactive and aggressive plan for process control across the SSP

b. Establish and implement "best practices" across the SSP

c. Review and critique standards for critical processes and develop a critical process matrix

d. Identify and communicate process control "lessons learned"

e. Create an awareness program using videos, newsletters, etc. to communicate the process control message to all levels of the program, including subtier suppliers

f. Establish process control metrics and a formal reporting channel

This report highlights the activities and the accomplishments of the PCFG through December 2001.

The mission of the Process Control Focus Group is to reduce risk to the Space Shuttle Program by reducing and/or eliminating process escapes.

Program Management

The SSP Process Control Management Plan, NSTS 37358, was a collaborative effort by the PCFG baselined through the Space Shuttle Program Requirements Change Board (PRCB) and released on December 18, 2000. This document identifies eight minimum standards for process control and provides examples from across the SSP to meet the standard (see Figure 1.0 - Standards of Process Control). The prime contractors have subsequently developed Process Control Plans within their organizations to address the requirements identified in the NSTS 37358.

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Face-to-face meetings are conducted quarterly at a minimum to discuss strategies on how to effectively and efficiently reach the supply chain with the process control message, share best practices, and lessons learned. The team also communicates monthly via telecom to status action items and to reach consensus on pending items.

In an effort to provide the supply base with the resources necessary to understand and implement process control activities, websites have been established with multiple purposes. The **www.CountdownOnline.tv** website contains video clips and information on upcoming videos and promotional items and includes a link to **http://process.nasa.gov** the SSP PCFG website. This website contains the contact names and phone numbers for the representatives of the PCFG, best practices, articles relating to process control and additional links to other websites, including lessons learned. To monitor effectiveness and provide the PCFG with feedback a detailed report is generated indicating the number of hits and visitors to these websites.

The PCFG uses a process control intranet to facilitate communication in connection with the PCFG and the agency-wide Process Control Working Group. This internal tool provides the mechanism to post activities of sub-teams, documents for review, meeting minutes, calendar of events, and other pertinent information.

Interfaces

The Process Control Focus Group interfaces periodically with other teams across the agency and industry to leverage knowledge, expertise and combine resources where applicable. These interfaces provide a valuable information resource to alleviate duplication of effort and ensure all parties are apprised of the latest activities and accomplishments. The focus of these teams is often complimentary to one another and mutually beneficial thereby reinforcing the importance of maintaining that linkage.

NASA Agency

The PCFG coordinates with various organizations through a direct or indirect affiliation, such as the Quality Leadership Forum (QLF) established by the Office of Safety and Mission Assurance NASA Headquarters. The QLF intranet provides a direct link with the activities of various sub-teams working a variety of issues and concerns some of which are directly related to process control.

Other Aerospace Affiliations

The contractors represented on the PCFG are also involved in other organizations and/or teams, such as the Aerospace Industries Association (AIA), Americas Aerospace Quality Group (AAQG), and the International Aerospace Quality Group (IAQG) to name a few. These affiliations provide a forum for expressing ideas and are vital to ensuring issues and concerns are addressed by the appropriate organization.

Standards of Process Control

Standard 1: Implementation of capability for early detection of variability of processes and uncoordinated changes.
Standard 2: Implementation of controls and audits to eliminate process "creep" (i.e., assure that actual practice complies with written instructions).
Standard 3: Aggressive maintenance of systems for understanding and mitigating process risks.
Standard 4: Provide design product and process orientation by sharing lessons learned and by identifying critical characteristics and processes to control.
Standard 5: Personal accountability and responsibility to perform exactly in the manner described in written procedures and work instructions.
Standard 6: Maintain a robust, multifaceted program to promote awareness of process control, the need to fully understand and report changes, and understand how a product fits into and impacts the overall program.
Standard 7: Maintain systems to identify and evaluate changes to equipment and environment.
Standard 8: Establish systems to capture and maintain process knowledge and skills.

Figure 1.0

Awareness Activities

The PCFG has been proactive and aggressive and is dedicated to increasing the awareness of process control across the SSP. The supplier base consists of over 800 first tier suppliers across the country, and thousands more when the second, third, and fourth tier suppliers are included. The prime contractors have identified their first tier suppliers and consolidated the listing resulting in approximately 32 suppliers being categorized as common among two or more prime contractors.

It is the goal of the PCFG to share the process control message, preferably face-to-face, with the first tier suppliers at least once every three years (see Figure 2.0 – Supplier Visits 2001). This may appear to be an insurmountable task, however in addition to the individual supplier visits; symposiums and/or conferences are periodically conducted with the potential of reaching a multitude of suppliers simultaneously.

The prime contractors have been conducting face-to-face supplier visits for several years and have found them to be highly effective. It provides the opportunity for the prime contractor to communicate their lessons learned in an attempt to create a comfortable environment for the supplier to participate in open dialogue and sharing of information and experiences. These exchanges are imperative for the SSP to become even better and continue flying safely.

The target audience is the individual working "on-the-floor" who in many instances is unaware of their role in the SSP. The connection is made when an Astronaut is in attendance emphasizing the importance of safety and process control.

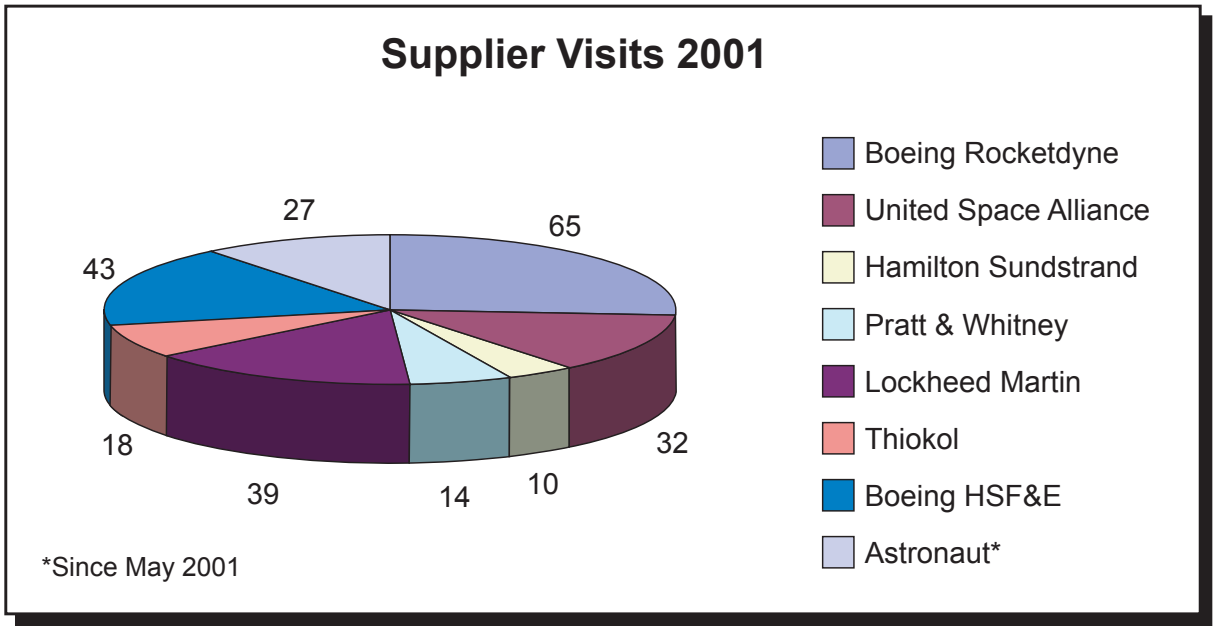


Figure 2.0

In the past few years several of the prime contractors have hosted supplier conferences with hundreds of suppliers in attendance. For 2001 a decision was made to have a unified Space Shuttle Program Supplier Symposium at Kennedy Space Center, Florida. The conference was originally scheduled for September 26-27, 2001, however due to the tragic events of September 11th it was appropriate to postpone it until January 23-24, 2002.

There were approximately 200 suppliers in attendance this year in addition to several Aerospace Safety Advisory Panel members, including executives from NASA and the prime contractors. The conference was extremely successful and the preparations for the 2003 Space Shuttle Program Supplier Symposium have already begun. The planning committee is also considering viable options for including sub-tier suppliers in this worthwhile event.

Astronaut Pamela Ann Melroy (Lieutenant Colonel, USAF) visiting Valve Tech, Inc. located in Phelps, New York.

Awareness Products

A variety of products have been developed to communicate the necessity of rigorous process controls. To effect or change a culture and maintain the momentum, the products are designed to be educational, motivational, and entertaining.

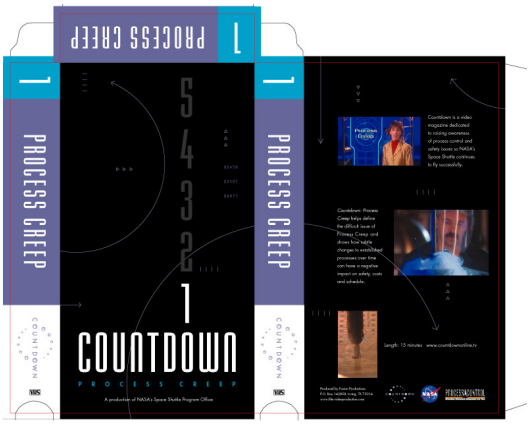
Videos and Posters

The initial video, **"Success in Process Control"** presents five lessons learned from across the program, which demonstrate and define process control. The process escapes included in this video are intended to educate and prevent the occurrence of the same or similar event by provoking thought. This video also illustrates the vast number of critical components and suppliers and sub-tiers necessary to launch a Space Shuttle.

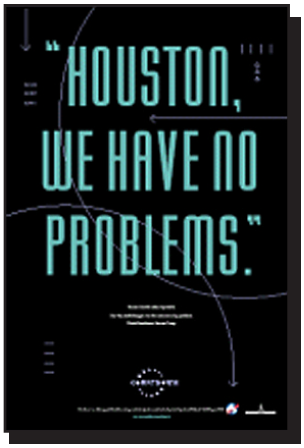
The video was recognized in the television, commercial, and video industry by receiving the 2001 Bronze Telly Award and the 2001 Bronze Catalyst Award.

A poster was developed to compliment the video and included the message, **"A Small Change Can Have A Big Impact"**. The practitioner on the production floor understands the process and is the first line of defense to prevent a process escape from occurring. Posters displayed throughout the shops are a constant reminder to be diligent in paying attention to detail and reinforcing the individual's responsibility.

The subsequent video is the first in the Countdown series, developed to take advantage of cost savings and efficiency by using a common format of being produced as a video magazine. The benefit to this format is that it promotes consistency and recognition as a product of the PCFG. **Countdown 1 "Process Creep"** explains how subtle changes over time to a process may have a negative impact on safety, schedule, and cost.



The poster that accompanied this video was a huge success and the quote is one that everyone would like to hear.



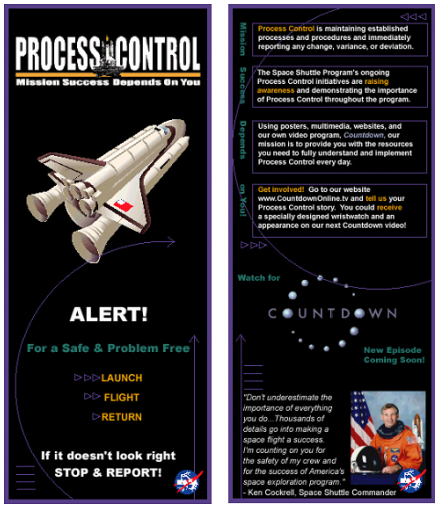
The use of these videos and posters has proven to be very effective and will continue to be produced with each subsequent video addressing one of the eight standards. The **Countdown 2 "Knowledge – Share the Experience"** is currently in production and is scheduled for release in early to mid 2002.

An additional feature of the Countdown series is a segment entitled, **"Celebrity Watch"**. During each episode of Countdown a special watch is awarded to an individual or group who made the right decision and reported a problem or concern and prevented a process escape or a serious condition from occurring. The "celebrities" are the working level people who make a difference. The entire SSP workforce is encouraged to submit stories through the **www.CountdownOnline.tv** website.

The videos and posters are an effective way to reach larger audiences, but it is the one-on-one contact with the individual that brings home the human element. The following products were developed with that in mind. They are items that can be disseminated to every employee with the goal of capturing their interest and encouraging them to get involved.

Bookmarks

The **Process Control Alert!** is a bookmark style brochure that features a stop and report message and provides information about process control and the Countdown series.



CD-ROM

The Process Control Interactive minidisk is in final modifications and will be ready for release in early 2002. This is a custom shaped interactive CDROM designed to further promote the process control message to the individual member of the workforce. It features important process control information; video clips from both videos and includes an interactive trivia game.

Logos

Logos provide the immediate identification with a particular product or initiative. The following two logos were developed for use on all marketing material to aid in the recognition of this program.

COUNTDOWN

PROCESS CONTROL

Mission Success Depends On You

Program Improvements

The PCFG was sponsored by JSC to participate in NASA's 16th Annual Continual Improvement (CI) and Reinvention Conference in Washington, D.C. on May 9-10, 2001. Each member of the PCFG received a NASA Group Achievement Award in recognition of the team's accomplishments.

Joyce Rozewski receiving the NASA Group Achievement Award from Mr. Dan Goldin, NASA Administrator.

Growth of Best Practices

A major advantage of the PCFG is the exchange of information and sharing of best practices. Since the inception, several prime contractors have adopted programs developed by other primes that were discovered through this forum. The willingness to share ideas and successes exemplifies the dedication and commitment to collectively improving the SSP and serves as a model for all NASA programs.

The following illustrates a few of the programs adopted and the originating organization:

- Supplier Baselines (Pratt & Whitney)
- Supplier Signature Requirements (Thiokol)
- Supplier Product Brochures (Boeing Rocketdyne)
- Integrated Product and Process Development (Boeing Rocketdyne)
- Personal Warranty Program (Boeing Rocketdyne)
- Build-to-Packages (Boeing Rocketdyne)

The cross-pollination between prime contractors will continue as new tools and methodologies are discovered, developed, and proven effective. The ability to ensure effective process controls is paramount to maintaining safety in the predominantly shrinking budget environment of today. The prime contractors are sensitive to the need for this type of activity to permeate through the entire supply chain without being intrusive, but will continue to nurture this methodology.

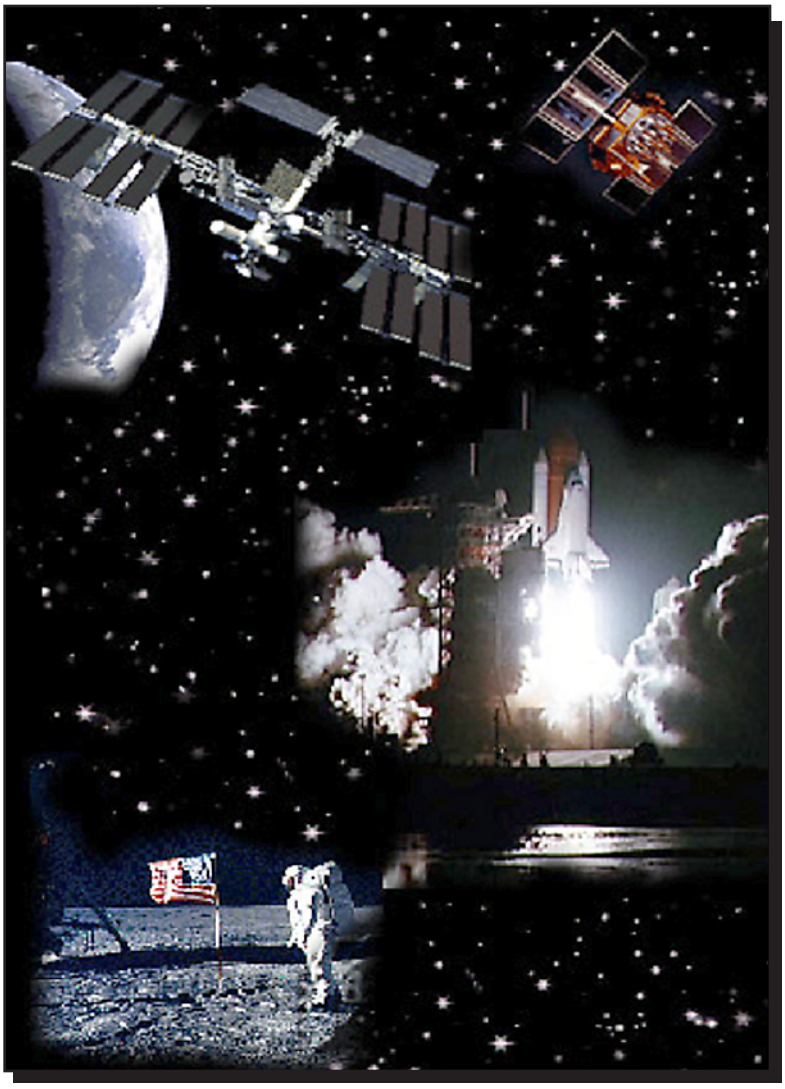
Best Practices Handbook

Suppliers continue to be exposed to presentations that emphasize the need for rigorous process control, but little or no guidance is provided as to what that would entail. The PCFG reviewed the eight standards identified in NSTS 37358 and determined that the examples provided were the "how to" from the contractor's point of view. Although these tools are effective for the prime contractor, they may or may not be as effective for the supplier. It was concluded to be more advantageous for the supplier to understand the intent of the standard affording them the opportunity to develop and/or implement the tools and methodologies that are suitable for their organization. A handbook was prepared document-

ing the standard, intent, and includes the tools being utilized from across the SSP with a brief description of each. These handbooks can be obtained via the PCFG website at **http://process.nasa.gov** and will also be available during supplier visits. The supplier is encouraged to contact the individuals identified for additional information or assistance.

Practitioner's Guide to Process Control

The PCFG in conjunction with the agency-wide Process Control Working Group is in the initial stages of developing a Practitioner's Guide to Process Control. The purpose will be to take the definitions, best practices, and approaches and provide a guide on how these methods/techniques can be implemented by the supplier. The guide will provide an overall structure for implementing process control practices in aerospace production/operations.



Contractor Initiatives

The following is a synopsis of successes and current activities from across the SSP.

United Space Alliance

In late 2001, the United Space Alliance (USA) Shuttle Program Manager in association with Safety Quality & Mission Assurance initiated the next phase of process control within the organization. A Standards Team was chartered through the Space Flight Operations Contract (SFOC) Program Review Board (PRB) to focus on standardization of process control tools and methodologies within USA. The initiative is being managed by the SFOC PRB, which provides visibility to the stakeholders and monitors the progress of activities and facilitates feedback.

The Standards Team was specifically chartered to:

- Develop USA process control standards
- Define process control metrics and oversight requirements
- Integrate lessons learned and Continuous Improvement into process control standards
- Develop USA process control policies and procedures
- Integrate the items above into a documented process control architecture
- Horizontally integrate associated systems across the company

In addition, the team will develop a process control maturity model to manage and continuously improve designated processes. It was recommended to review the Capability Maturity Model Integrated (CMMI) as a point of reference for developing the concept of a process control maturity model.

To date the team has developed a standard list of operational definitions, identified control and reporting metrics, and documented the process control architecture including the associated top level standards. The team anticipates completing all products by early 2002 and then coordinating with the Implementation Team and Technical Systems Team.

ATK Thiokol Propulsion

Developing accurate engineering design and manufacturing process requirements continues to be a primary focus of the Reusable Solid Rocket Motor (RSRM) Project. ATK Thiokol Propulsion has implemented the Integrated Product and Process Development (IPPD) process, initially developed by Boeing Rocketdyne, to facilitate concurrent development of engineering and process requirements. The pilot work center where IPPD was initially implemented has experienced a 93% reduction in error correction engineering change orders and an 82% reduction in product nonconformances by using the IPPD process.

A Stamp Warranty Assurance Team (SWAT) was formed to reinforce the principle that a stamp or signature is a professional, individual guarantee that work was literally performed as stated in the work instructions. The team has developed a “process creep” icon that has been used throughout the SSP. In addition, the team has developed training, an awards program, a company website, and as effective poster campaign that all reinforce the importance of stamp

warranty. These tools are being utilized at ATK Thiokol Propulsion and their suppliers.

Communication with suppliers on the importance of their products to the safety and quality of the space shuttle system is a priority for the RSRM Project. ATK Thiokol Propulsion has developed a single page supplier product brochure to communicate with suppliers exactly where their product is used on the solid rocket motor and the importance of that product. In addition, the brochure contains a safety message and lists points of contact and web sites where more information can be obtained on NASA and space. The brochure is a spin-off from product fact sheets developed by Boeing Rocketdyne.

Hamilton Sundstrand Space Systems International

During 2001, thirty-seven Manufacturing Process Proofs were conducted on processes such as, electrochemical platinum plating, passivation, and hand soldering.

Manufacturing Process Proofing consists of a structured review of the key inputs to a manufacturing process in order to ensure the consistency and acceptability of process outputs. Overall responsibility for this review resides with Process Engineers who have been specifically named as the process owners. Results of the review are documented on Process Definition Sheets and include objective evidence that the process is producing acceptable outputs to meet the hardware requirements. Each process is analyzed with the five process control elements (methods, materials, equipment, people, and environment). If results of the process proofing need improvement, then actions are assigned to cognizant Process Engineers to incorporate.

In addition, twenty-five Product Protection Analyses were performed. The Product Protection Analyses (PPA) process is a review process used to identify potential hazards to flight hardware that can be encountered during testing. These hazards can be caused by the test rig, facility, tooling, and/or test environment. Once the PPA is complete and hazards are identified, modifications are incorporated to eliminate the hazards prior to testing.

To perform a PPA, the test item is first reviewed by the responsible Test Engineer to determine its level of complexity. For non-complex hardware, a PPA may be performed by a Test Engineer alone. For complex hardware, the Test Engineer forms an interdisciplinary team composed of representatives from Engineering, Operations and the Space Systems Laboratory to perform the PPA.

The Test Engineer or PPA team performs the PPA and identifies a list of hazards to be mitigated. From this list, actions are generated to address all the identified hazards. Corrections are then implemented to mitigate these hazards. Upon completion of all actions, the item can be released to the Space Lab to commence testing.

As a result of performing the PPA, a baseline configuration of the hardware to the rigs, facility, special test equipment and tool-

ing is developed. This baseline is then used to identify any changes that have occurred prior to the next time the hardware is tested. If there have been changes, they are assessed for possible risk to hardware damage. Mitigation steps are then implemented and the baseline documentation is updated for future use.

Boeing Rocketdyne

A proactive Build-to-Package approach to partnering with suppliers continues to yield positive results on the Space Shuttle Main Engine Program. Process Control Reviews held at several suppliers resulted in improved planning, the clarification of inspection criteria, resolution of sub-tier supplier flow-down requirements, production support material usage clarification, tooling enhancements, and clarification of source inspection requirements.

A multifaceted assessment conducted at the forging supplier on the Main Combustion Chamber Liner resulted in improved process controls, new tooling development, and elimination unwanted grain growth on prior units. Extensive involvement with suppliers also resulted in the development of techniques to clean and verify contamination removal from Low Pressure Fuel Ducts and protect the critical internal components during the process.

In addition, the accompanying Process Control briefings continued to raise awareness regarding hardware criticality and the need to maintain process integrity.

Lockheed Martin Space Systems Company, Michoud Operations

Partnering with suppliers to enhance process controls is an important element of maintaining the continued success of the external tank. As a result of partnering, the constant reinforcement of process control, and the contractually imposed items listed below, Lockheed Martin Space Systems Company, Michoud Operations has achieved a 99.9% acceptance rate on flight hardware (251,930 of 252,023 flight hardware articles, excluding fasteners & raw materiel). The following process control requirements are contractually imposed on suppliers delivering products and/or services for Michoud Operations:

- No Change Policy
- Material Data Analysis Team to identify and resolve issues with out-of-family material
- Bottoms Up Survey/Audit Technique
- Suppliers must obtain approval of second tier and subsequent tier's purchase orders from Michoud Operations
- Part peculiar process validations (process proofing)
- Planned process and system surveillance
- Baseline supplier process by review and approval of Manufacturing Flow Charts

Featured Suppliers' Successes

At the 2001 Space Shuttle Program Supplier Symposium two suppliers presented their success stories relating to process control. The PCFG felt it would be valuable for the suppliers in the audience to hear the accomplishments from their peers vs. only the customer. The following is a brief summary from those suppliers.

Cytec Engineered Materials

Cytec provides ablatives - fabric broadgoods, tapes and molding compounds for use in the solid / liquid rocket motor industry. Variation is the enemy in any business and

even more so in the rocket motor industry. Current control is managed through established baselines and Statistical Process Control. Cytec has implemented the Product/Process Integrity Assessment (PPIA) and is utilizing Six Sigma to define and validate key critical parameters, understand the elements of variation – process vs. measurement, and establish control systems for the known critical parameters.

Cytec participates with their customer and sub-tier suppliers in an effort to enhance the understanding of nozzle material production, to minimize potential program disruption and maximize efficiencies through variation reduction. The focus is to improve communication, reduce material variation, early identification of material obsolescence issues, and rapid problem resolution.

The commitment and dedication has resulted in resin control parameters being defined and implemented, instrumentation upgrades to measure "what the material actually sees", root causes were identified in Silica property shifts, reduced resin variation and contamination issues being identified at sub-tier levels. Their final message was to involve your suppliers, expand your definition of "critical parameters", create operator awareness through involvement and communication, identify and control everything that "touches" the product, and create an environment to capture and respond to operator observations.

AMRO Fabricating Corporation

AMRO is a leading manufacturer for aerospace, defense and commercial markets and provides machined and formed orthogrid skin panels for the external tank. The tenets of AMRO are to support the customer, control process variations, first time quality, special emphasis on safety, provide afford-

able and reliable products, and to reduce cycle time through continuous improvement.

The key elements of process control; methods/instructions, people, material, equipment, and environment have been enhanced at AMRO by implementing the following:

- Detailed manufacturing flow chart
- Detailed Process Instructions
- Integrated quality and manufacturing planning
- Stringent receiving control
- Sub-tier controls
- Scheduled internal/external audits
- Safety training and awareness program
- Continuous employee training
- Proactive management that fosters pride of workmanship
- Process ownership and accountability
- Preventive maintenance and calibration controls
- Evaluation and coordination of changes and effects
- Detailed documentation of all processes

By ensuring stringent process controls and attention to detail, AMRO has achieved success through process control and has received the Lockheed Martin "STAR" Supplier Award for facility level and the Boeing Preferred Supplier Award.

Forward Planning

The PCFG was chartered to address specific items relating to process control, and a major component of that is addressing the culture across the SSP at all levels. The PCFG has been aggressive at increasing the awareness of process control by utilizing videos that convey process control messages and share lessons learned. In addition, other marketing tools such as posters, bookmarks, and websites have been developed.

The first installment of Countdown, a recurring video series aimed at promoting a heightened awareness of Process Control was released in 2001. The series will continue into 2002 with **Countdown 2 "Knowledge – Share the Experience"**, and each subsequent video will continue to explore timely and relevant process control issues, review lessons learned, and further recognize new and innovative ways of implementing process control.

The series promotes the idea that each individual is responsible for process control in his or her own way. As part of their on-scene "Celebrity Watch" segment the Countdown production staff will travel far and wide to recognize various individuals for their attention to detail and diligence. Such individuals have consistently demonstrated their willingness to go the extra step in favor of process control and avert future process escapes.

To aid in the development of awareness tools the PCFG will focus on establishing a metric set to determine the effectiveness and additional areas of emphasis for future products. An analysis of program level metrics is also an indicator of the impact of this team on reducing and/or eliminating process escapes. The PCFG will continue to monitor this data for the identification of trends.

The continuous sharing of best practices and lessons learned is an on-going activity and the contractors will work diligently to engage their suppliers. It is anticipated through the collaboration of the PCFG and the NASA Agency Process Control Working Group to proliferate the entire aerospace supply base with the process control message. An additional method is to continue including supplier presentations at the annual SSP symposium focusing on the best practices implemented and their success stories. Some suppliers may be more readily apt to adopt best practices when a peer vs. customer presents them.

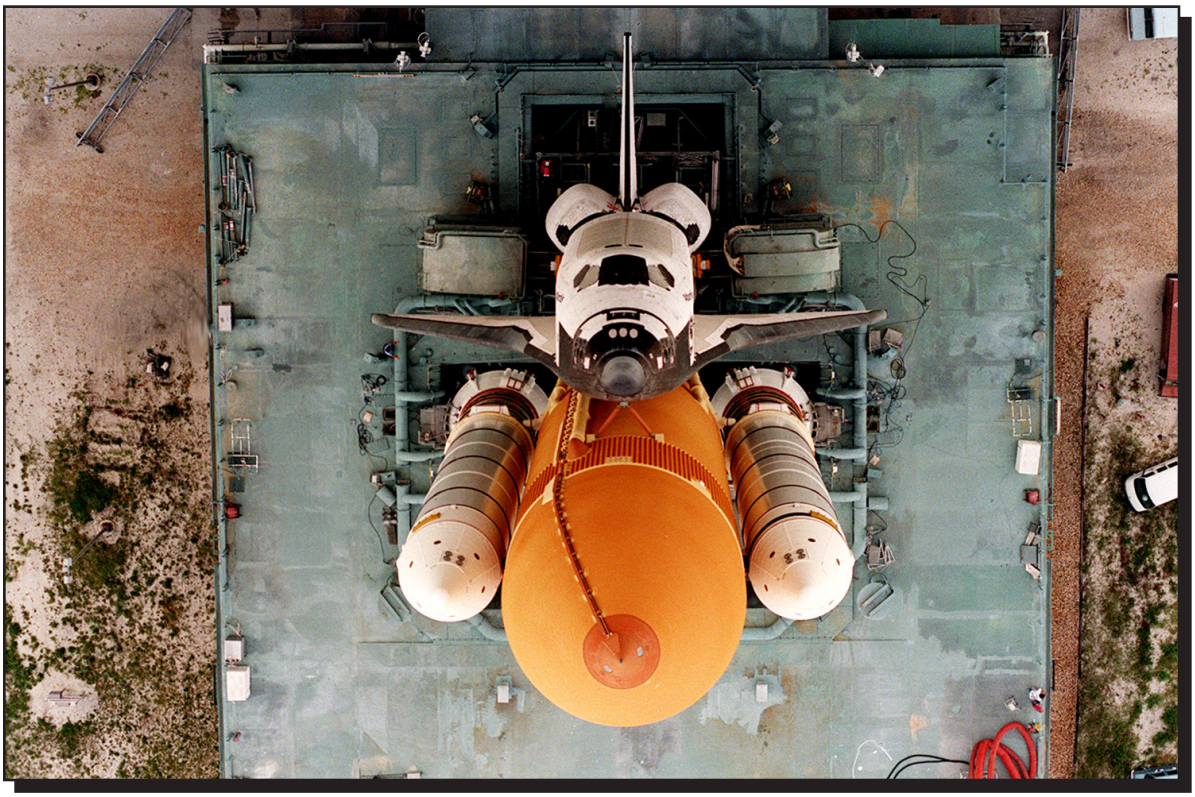
The PCFG is dedicated to improving processes, while maintaining safety and reducing costs to the SSP. This initiative is important to protecting the public, astronauts and pilots, the NASA, contractor, and supplier workforce, and the high-valued equipment and property. It is everyone's responsibility to ensure process controls are in-place, effective, and adhered to in order to guarantee the continued success of America's Space Program.

Supplier Training

The PCFG has also explored the concept of developing a training program for suppliers. Several concerns were identified, which included cost, resource availability, course content, and contractual relationships. The challenge is how to engage the supplier in these worthwhile programs without infringing or imposing on them, or receiving a con-

tract change for additional monetary value.

Another avenue being discussed is to conduct small training sessions in concert with the SSP Supplier Symposiums. This type of environment fosters teamwork and is less intimidating than a prime contractor imposing on a supplier one-on-one. Further discussions will be held among the supplier conference planning committee and PCFG to determine the feasibility of conducting these training sessions.



Appendix A

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United Space Alliance
Tammi Belt
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Pratt & Whitney
Dan Specksgoor
Dan Dannecker

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Todd Sims

Appendix B

Acronyms and Abbreviations

AAQG	Americas Aerospace Quality Group
AIA	Aerospace Industries Assoc.
CI	Continual Improvement
CMMI	Capability Maturity Model Integrated
IAQG	International Aerospace Quality Group
IPPD	Integrated Product and Process Development
JSC	Johnson Space Center
KSC	Kennedy Space Center
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
PCFG	Process Control Focus Group
PCWG	Process Control Working Group
PPA	Product Protection Analysis
PPIA	Product Process Integrity Assessment
PRB	Program Review Board
PRCB	Program Review Change Board
QLF	Quality Leadership Forum
RSRM	Reusable Solid Rocket Motor
SFOC	Space Flight Operations Contract
SSC	Stennis Space Center
SSP	Space Shuttle Program
SWAT	Stamp Warranty Assurance Team
USA	United Space Alliance

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